

Patent claims

1. A serial communication system comprising a master unit and a plurality of slave units which are interconnected as a concatenation of point-to-point connections in line topology, further comprising an additional connection between the master unit and the slave unit which is furthest away from the master unit in the line and which additional connection, in the event of an interruption in the line topology serves to communicate with the isolated slave units.
2. The system according to claim 1, wherein the additional connection can only be activated in the event of a line interruption in the line topology.
3. The system according to claim 1, wherein the additional connection serves for monitoring purposes during normal operation.
4. The system according to claim 1, further comprising a detector for detecting an interruption, in the line topology which activates the additional connection.
5. The system according to claim 4, wherein the detector is arranged in the master unit.

6. The system according to claim 1, wherein a synchronous data transfer takes place on the line topology by means of cyclic telegrams exchanged in a transmission cycle, and further comprising a counter provided in each slave unit for each data direction, for determining valid telegrams transmitted in a last transmission cycle, and wherein a respective counter reading of a slave unit can be communicated from the slave unit as part of a telegram sent to the master unit per transmission cycle, whereby a line interruption can be localized using the counter readings of all the slave units.

7. The system according to claim 6, in which a failure of a number of cyclic telegrams sent from the master unit to the slave units, said failure resulting from a line interruption, is identified, wherein a line interruption in the master unit can be localized using the counter readings reported by the slave units which are situated downstream of the disturbed location in the line topology.

8. The system according to claim 6 in which a failure of a number of cyclic telegrams which have been sent from the slave units to the master unit is identified, wherein the line interruption in the master unit can be localized using the counter readings reported by the slave units which are situated upstream of the disturbed location in the line topology.

9. The system according to claim 5, wherein the detector is embodied as a suitably programmed microprocessor.

10. A method for producing a connection redundancy for a serial communication system having a master unit and a plurality of slave units which are interconnected as a concatenation of point-to-point connections in line topology comprising providing an additional connection between the master unit and the slave unit which is furthest from the master unit in the line topology, said additional connection undertaking the communication with the isolated slave units in the event of a line interruption in the line topology.

11. The method according to claim 10, further comprising the steps of activation of the communication to the isolated slave units via the additional connection in the event of a line interruption in the line topology, and informing the isolated slave units via the additional connection that the master unit can only be reached via the additional connection.

12. The method according to claim 10, wherein the line interruption is intermittent and further method comprising localization of the interruption location and production of a permanent interruption by communication to the last slave unit upstream of the interruption location for establishing the transmission of telegrams.

13. The method according to claim 10, further comprising a synchronous data transfer taking place on the communication line by means of cyclic telegrams exchanged in the transmission cycle, wherein localizing a line interruption results from a determination of the valid telegrams transmitted in the last transmission cycle for each slave unit for each data direction; communication of the respective determined number of a slave unit as part of a telegram sent to the master unit per transmission cycle to the master unit; and localization of a line interruption using the reported numerical values of all the slave units.

14. The method according to claim 13, wherein identification of a failure of a number of cyclic telegrams sent from the master unit to the slave units results from localization of the line interruption in the master unit using the numerical values reported by the slave units which, are situated downstream of the disturbed location in the line topology.

15. The method according to claim 13, wherein identification of a failure of a number of cyclic telegrams, which have been sent from the slave units to the master unit result from localization of the line interruption in the master unit using the numerical values reported by the slave units which, are situated upstream of the disturbed location in the line topology.